

## **The National Energy Technology Coal Utilization By-products Program**

In December of 2000, EPA announced its intention to regulate mercury emissions from coal-fired electric utilities. Removing mercury from flue gas will likely result in mercury partitioning to the solid fraction, either fly ash or FGD material. EPA intends to guarantee that mercury is removed from the global pool and is therefore concerned about potential re-release from the by-product into the environment. To address this issue, NETL has sponsored by-product research to determine the impacts of mercury regulations on the environment, as well as, impacts on utilization. NETL also hosted a workshop in March to determine what knowledge currently exists regarding mercury in by-products.

Mercury is a toxic metal that is known to bioaccumulate in the food chain. Therefore, it is necessary to understand any and all possible mechanisms by which mercury may be released. Consequently, NETL has funded research projects to address:

- Volatilization of mercury from by-products during disposal or high temperature reuse processes;
- Leaching of mercury from by-products under both disposal and reuse scenarios; and
- Microbial transformation of mercury.

Utilization research projects focus on the effect of mercury controls on the continued marketability of CUB products. Annually the U.S. produces over a million tons of by-products. Fly ash production is approximately 64 million tons/yr. while FGD is 26 million tons/yr. <sup>1</sup>. ACAA reports that 32% of fly ash was utilized in 2000. Preliminary research shows that if activated carbon becomes the preferred method of mercury control, this market may be threatened. Similarly, 19% of FGD material was used in 2000 mostly as synthetic gypsum for wallboard manufacturing operations. Questions exist regarding the stability of the mercury in the FGD material when used for this high temperature process. NETL is funding projects that will determine:

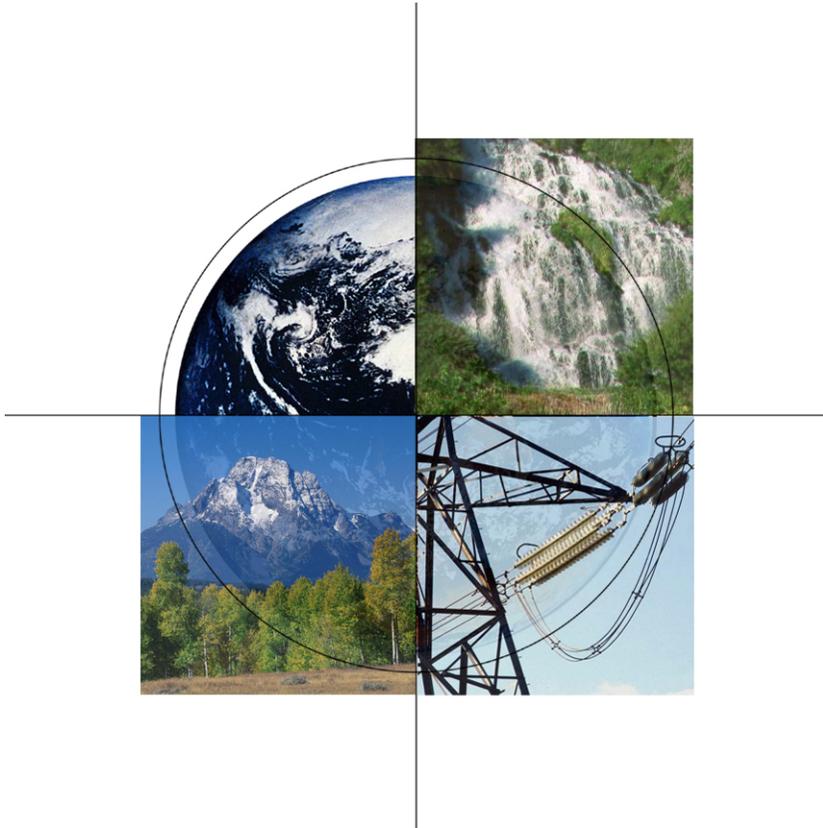
- Whether fly ashes containing activated carbon can be marketed;
- If beneficiation of the activated carbon can be accomplished; and
- If increased concentrations of mercury in FGD will be detrimental to the wallboard product.

As alternative technologies for mercury control are developed, NETL will continue to fund research to determine the effect of the new controls on both the environment and by-product utilization.

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<sup>1</sup> ACAA Annual Generation and Use Statistics, 2000.

# DOE/NETL Hg & CUB Perspective



**Air Quality III Conference  
Arlington, VA**

**Lynn A. Brickett  
September 10, 2002**

**National Energy Technology Laboratory**



# Hg Control - The Effects on By-Products: What Do We Know and Where Do We Go?

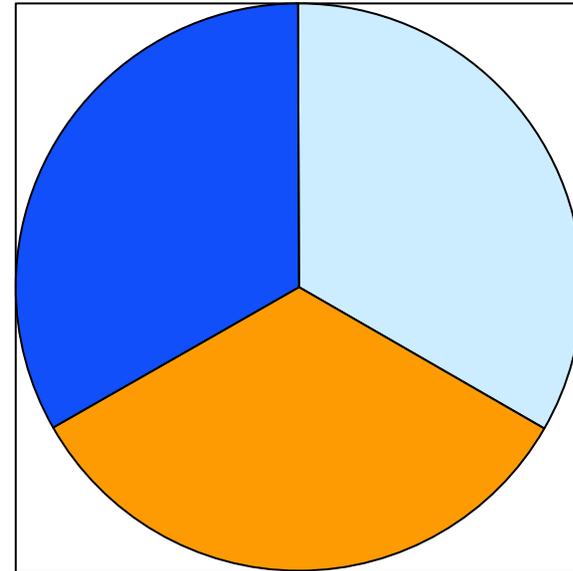


March 19, 2002  
Hyatt Regency - Pittsburgh, PA



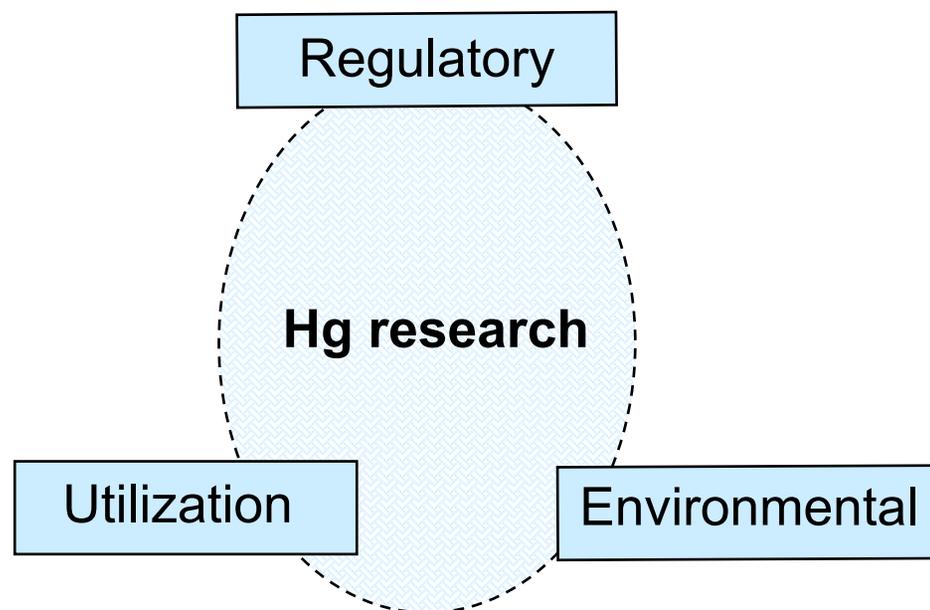
# NETL By-product program components

- **Three components**
  - Environmental issues
  - Increased utilization
  - Regulatory



# Hg in By-products

- **NETL CUB Hg research crosscuts all components**
  - Regulatory
    - EPA - Hg release from by-products?
    - Other pollutants
      - As, Se, Cd and Pb
  - Utilization
    - FGD
    - Fly ash
  - Environmental
    - Volatilize
    - Leach
    - Microbial transformation



# Regulatory Activities

- Obtain samples for EPA
- Share data
- Provide stakeholder feedback
- Co-sponsor CUB forums



# Environmental Projects

- **CONSOL**
- **ADA**
- **B&W**
- **Apogee**
- **URS**
- **CONSOL**
- **NETL in-house**
- **UNDEERC - award 9/02**
  - volatilization
  - leaching
  - microbial mobilization



NETL In-house leaching Lab



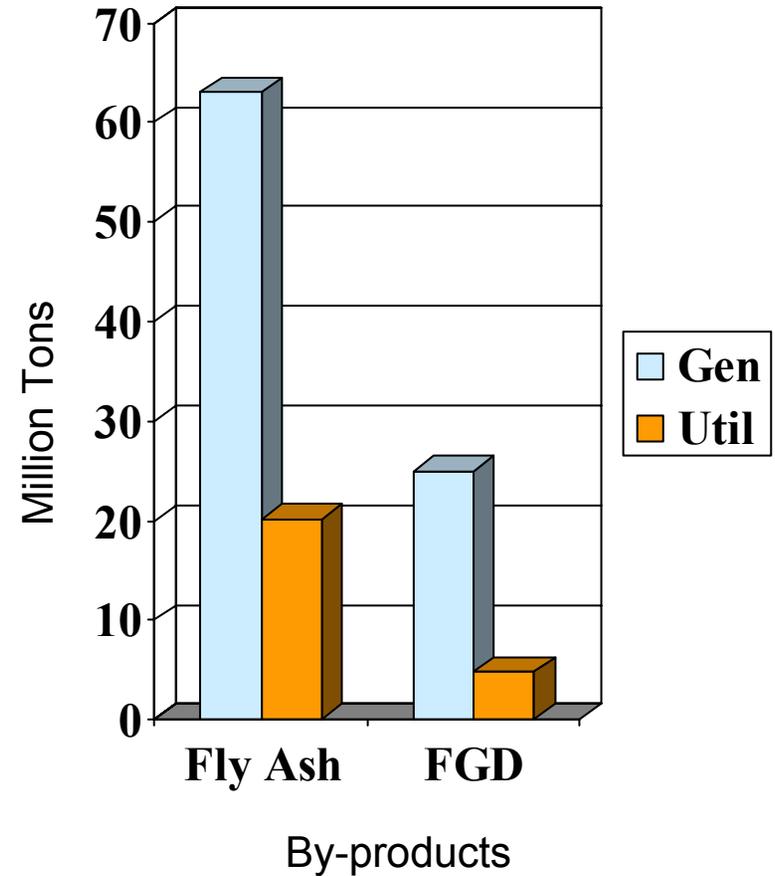
# Utilization Projects

## Fly Ash

- Cement/concrete
- **Projects**
  - ADA
  - Apogee

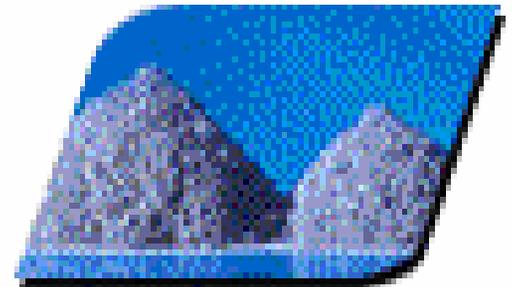
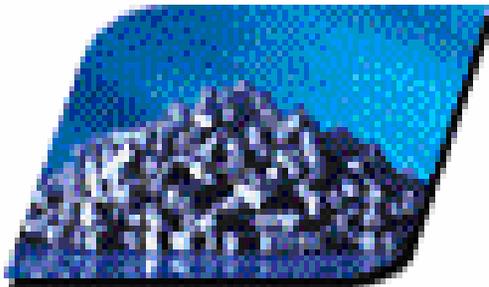
## FGD

- Wallboard
- **Projects**
  - B&W
  - TVA



# CUB effects from ACI

- **NETL model analysis indicates:**
  - 26 M tons of fly ash will contain A.C.
  - 39% of the fly ash will be impacted
  - Generate 1.4M tons of A.C. residue



Norit® Activated Carbons



# Conclusions

- **Beginning to understand Hg control**
- **Understand Hg in traditional by-products**
- **Hg control= new by-products**
- **NETL will continue to evaluate the effect of Hg on by-products**



Mercury Highway

# CUB Webpage

**Environmental & Water Resources:**

**[WWW.NETL.DOE.gov/coalpower/environment](http://WWW.NETL.DOE.gov/coalpower/environment)**

